IN THE CLAIMS:

1. (Previously Presented) A method of manufacturing a semiconductor device comprising the step of:

forming a semiconductor film having an amorphous structure over a substrate;

crystallizing the semiconductor film;

forming an insulating film over the semiconductor film;

ion-doping an impurity element into a channel region of the semiconductor film through the insulating film,

wherein said impurity element imparts n-type conductivity or p-type conductivity to said semiconductor film,

wherein a concentration of said impurity element is in the range from 1×10^{15} to 5×10^{17} atoms/cm^3 in said semiconductor film after the step, and

wherein a concentration of carbon is at 3×10^{17} atoms/cm^3 or less in said semiconductor film after the step.

2. (Previously Presented) A method of manufacturing a semiconductor device comprising the step of:

forming a semiconductor film having an amorphous structure over a substrate;

crystallizing the semiconductor film;

forming an insulating film over the semiconductor film;

ion-doping an impurity element into a channel region of the semiconductor film through the insulating film,

wherein said impurity element imparts n-type conductivity or p-type conductivity to said semiconductor film,

wherein a concentration of said impurity element is in the range from 1×10^{15} to 5×10^{17} atoms/cm^3 in said semiconductor film after the step, and

wherein a concentration of nitrogen is at 1×10^{17} atoms/cm^3 or less in said semiconductor film after the step.

3. (Previously Presented) A method of manufacturing a semiconductor device comprising the step of:

forming a semiconductor film having an amorphous structure over a substrate;

crystallizing the semiconductor film;

forming an insulating film over the semiconductor film;

ion-doping an impurity element into a channel region of the semiconductor film through the insulating film,

wherein said impurity element imparts n-type conductivity or p-type conductivity to said semiconductor film,

wherein a concentration of said impurity element is in the range from 1×10^{15} to 5×10^{17} atoms/cm^3 in said semiconductor film after the step, and

wherein a concentration of oxygen is at 3×10^{17} atoms/cm^3 or less in said semiconductor film after the step.

4. (Previously Presented) A method of manufacturing a semiconductor device according to claim 1, wherein no mass separation is performed in the ion-doping step.

5. (Cancelled).

6. (Previously Presented) A method of manufacturing a semiconductor device according to claim 1, wherein said semiconductor film is used as at least a channel forming region of a TFT.

7. (Previously Presented) A method of manufacturing a semiconductor device according to claim 1, wherein said impurity element imparting p-type conductivity comprises a gas containing diborane, BF_2, or boron.

8. (Previously Presented) A method of manufacturing a semiconductor device according to claim 1, wherein said impurity element imparting n-type conductivity comprises either one of a gas containing P or As, and phosphine.

9. (Previously Presented) A method for fabricating a semiconductor device according to claim 1, wherein the impurity element imparting p-type conductivity is doped into the semiconductor film by employing a source material gas that contains diborane diluted with hydrogen to the concentration in the range from 0.5% to 5%.

10. (Previously Presented) A method of manufacturing a semiconductor device according to any one of claims 1 to 3, wherein the impurity element imparting p-type conductivity is doped into the semiconductor film by employing a source material gas that contains diborane diluted with hydrogen to the concentration in the range from 0.5% to 1%.

11. (Previously Presented) A method of manufacturing a semiconductor device according to claim 1, wherein the semiconductor device is one selected from the group consisting of a personal computer, a video camera, a portable information terminal, a digital camera, a digital video disk player, an electronic amusement apparatus, and a projector.

12. (Previously Presented) A method according to claim 1, wherein the concentration of hydrogen to be ion-doped simultaneously with said impurity element in said semiconductor film is set to be at 1×10^{19} atoms/cm^3 or less.

13. (Previously Presented) A method of manufacturing a semiconductor device comprising the step of:

forming a semiconductor film having an amorphous structure over a substrate;

crystallizing the semiconductor film;

forming an insulating film over the semiconductor film;

ion-doping an impurity element into a channel region of the semiconductor film through the insulating film,

wherein said impurity element imparts n-type conductivity or p-type conductivity to said semiconductor film,

wherein a concentration of said impurity element is in the range from 1×10^{15} to 5×10^{17} atoms/cm^3 in said semiconductor film after the step, and

wherein a concentration of hydrogen is at 1×10^{19} atoms/cm^3 or less in said semiconductor film after the step.

14. (Previously Presented) A method of manufacturing a semiconductor device comprising the step of:

forming a semiconductor film having an amorphous structure over a substrate;

crystallizing the semiconductor film;

forming an insulating film over the semiconductor film;

ion-doping an impurity element into a channel region of the semiconductor film through the insulating film,

wherein said impurity element imparts n-type conductivity or p-type conductivity to said semiconductor film,

wherein a concentration of said impurity element is in the range from 1×10^{15} to 5×10^{17} atoms/cm^3 in said semiconductor film after the step, and

wherein said impurity element is doped into said semiconductor film by using a source material gas containing said impurity element diluted with hydrogen to the concentration in the range from 0.5% to 5%.

15. (Previously Presented) A method of manufacturing a semiconductor device according to claim 2, wherein no mass separation is performed in the ion-doping step.

16. (Previously Presented) A method of manufacturing a semiconductor device according to claim 3, wherein no mass separation is performed in the ion-doping step.

17. (Previously Presented) A method of manufacturing a semiconductor device according to claim 13, wherein no mass separation is performed in the ion-doping step.

18. (Previously Presented) A method of manufacturing a semiconductor device according to claim 14, wherein no mass separation is performed in the ion-doping step.

19. (Previously Presented) A method of manufacturing a semiconductor device according to claim 2, wherein said semiconductor film is used as at least a channel forming region of TFT.

20. (Previously Presented) A method of manufacturing a semiconductor device according to claim 3, wherein said semiconductor film is used as at least a channel forming region of TFT.

21. (Previously Presented) A method of manufacturing a semiconductor device according to claim 13, wherein said semiconductor film is used as at least a channel forming region of TFT.

22. (Previously Presented) A method of manufacturing a semiconductor device according to claim 14, wherein said semiconductor film is used as at least a channel forming region of TFT.

23. (Previously Presented) A method of manufacturing a semiconductor device according to claim 2, wherein said impurity element imparting p-type conductivity comprises a gas containing diborane, BF_2, or boron.

24. (Previously Presented) A method of manufacturing a semiconductor device according to claim 3, wherein said impurity element imparting p-type conductivity comprises a gas containing diborane, BF_2, or boron.

25. (Previously Presented) A method of manufacturing a semiconductor device according to claim 13, wherein said impurity element imparting p-type conductivity comprises a gas containing diborane, BF_2, or boron.

26. (Previously Presented) A method of manufacturing a semiconductor device according to claim 14, wherein said impurity element imparting p-type conductivity comprises a gas containing diborane, BF_2, or boron.

27. (Previously Presented) A method of manufacturing a semiconductor device according to claim 2, wherein said impurity element imparting n-type conductivity comprises either one of a gas containing P or As, and phosphine.

28. (Previously Presented) A method of manufacturing a semiconductor device according to claim 3, wherein said impurity element imparting n-type conductivity comprises either one of a gas containing P or As, and phosphine.

29. (Previously Presented) A method of manufacturing a semiconductor device according to claim 13, wherein said impurity element imparting n-type conductivity comprises either one of a gas containing P or As, and phosphine.

30. (Previously Presented) A method of manufacturing a semiconductor device according to claim 14, wherein said impurity element imparting n-type conductivity comprises either one of a gas containing P or As, and phosphine.

31. (Previously Presented) A method for fabricating a semiconductor device according to claim 2, wherein the impurity element imparting p-type conductivity is doped into the semiconductor film by employing a source material gas that contains diborane diluted with hydrogen to the concentration in the range from 0.5 to 5%.

32. (Previously Presented) A method for fabricating a semiconductor device according to claim 3, wherein the impurity element imparting p-type conductivity is doped into the semiconductor film by employing a source material gas that contains diborane diluted with hydrogen to the concentration in the range from 0.5 to 5%.

33. (Previously Presented) A method for fabricating a semiconductor device according to claim 13, wherein the impurity element imparting p-type conductivity is doped into the semiconductor film by employing a source material gas that contains diborane diluted with hydrogen to the concentration in the range from 0.5 to 5%.

34. (Previously Presented) A method of manufacturing a semiconductor device according to claim 2, wherein said impurity element imparting p-type conductivity is doped into the semiconductor film by employing a source material gas that contains diborane diluted with hydrogen to the concentration in the range from 0.5 to 1%.

35. (Previously Presented) A method of manufacturing a semiconductor device according to claim 3, wherein said impurity element imparting p-type conductivity is doped into the semiconductor film by employing a source material gas that contains diborane diluted with hydrogen to the concentration in the range from 0.5 to 1%.

36. (Previously Presented) A method of manufacturing a semiconductor device according to claim 13, wherein said impurity element imparting p-type conductivity is doped into the semiconductor film by employing a source material gas that contains diborane diluted with hydrogen to the concentration in the range from 0.5 to 1%.

37. (Previously Presented) A method of manufacturing a semiconductor device according to claim 2, wherein the semiconductor device is one selected form the group consisting of a personal computer, a video camera, a portable information terminal, a digital camera, a digital video disk player, an electronic amusement apparatus, and a projector.

38. (Previously Presented) A method of manufacturing a semiconductor device according to claim 3, wherein the semiconductor device is one selected form the group consisting of a personal computer, a video camera, a portable information terminal, a digital camera, a digital video disk player, an electronic amusement apparatus, and a projector.

39. (Previously Presented) A method of manufacturing a semiconductor device according to claim 13, wherein the semiconductor device is one selected form the group consisting of a personal computer, a video camera, a portable information terminal, a digital camera, a digital video disk player, an electronic amusement apparatus, and a projector.

40. (Previously Presented) A method of manufacturing a semiconductor device according to claim 14, wherein the semiconductor device is one selected form the group consisting of a personal computer, a video camera, a portable information terminal, a digital camera, a digital video disk player, an electronic amusement apparatus, and a projector.

41. (Previously Presented) A method according to claim 2, wherein the concentration of hydrogen to be ion-doped simultaneously with said impurity element in said semiconductor film is set to be at 1×10^{19} atoms/cm^3 or less.

42. (Previously Presented) A method according to claim 3, wherein the concentration of hydrogen to be ion-doped simultaneously with said impurity element in said semiconductor film is set to be at 1×10^{19} atoms/cm^3 or less.

43. (Previously Presented) A method according to claim 14, wherein the concentration of hydrogen to be ion-doped simultaneously with said impurity element in said semiconductor film is set to be at 1×10^{19} atoms/cm^3 or less.